

**PCT**

NOTIFICATION CONCERNING  
TRANSMITTAL OF COPY OF INTERNATIONAL  
PRELIMINARY REPORT ON PATENTABILITY  
(CHAPTER I OF THE PATENT COOPERATION  
TREATY)  
(PCT Rule 44bis.1(c))

From the INTERNATIONAL BUREAU

To: 006	MONEY £
	ORDER
	DIARY
HAINES, Miles John D. Young & Co. REC'D 120 Holborn (LONDON) London EC1N 2DY ROYAUME-UNI	- 6 SEP 2006
	ANSO
	ENTRY
	FOR

DT MJH  
Records  
Noted

Date of mailing (day/month/year)  
31 August 2006 (31.08.2006)

Applicant's or agent's file reference  
P019290WO MJH

**IMPORTANT NOTICE**

International application No.  
PCT/GB2005/000360

International filing date (day/month/year)  
03 February 2005 (03.02.2005)

Priority date (day/month/year)  
16 February 2004 (16.02.2004)

Applicant  
OHM LIMITED et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Authorized officer

Nora Lindner

Facsimile No. +41 22 338 82 70

e-mail: pt02@wipo.int

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference P019290WO MJH	FOR FURTHER ACTION	See item 4 below
International application No. PCT/GB2005/000360	International filing date ( <i>day/month/year</i> ) 03 February 2005 (03.02.2005)	Priority date ( <i>day/month/year</i> ) 16 February 2004 (16.02.2004)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant OHM LIMITED		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application   |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Date of issuance of this report 22 August 2006 (22.08.2006)
Facsimile No. +41 22 338 82 70	Authorized officer  Nora Lindner  e-mail: pt02@wipo.int

# PATENT COOPERATION TREATY

25/108

From the  
INTERNATIONAL SEARCHING AUTHORITY

REC'D 25 MAY 2005

PCT  
WIPO PCT

To:

see form PCT/ISA/220

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/GB2005/000360

International filing date (day/month/year)  
03.02.2005

Priority date (day/month/year)  
16.02.2004

International Patent Classification (IPC) or both national classification and IPC  
G01V3/12

Applicant  
OHM LIMITED

### 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

### 3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk - Pays Bas  
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl  
Fax: +31 70 340 - 3016

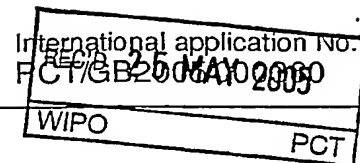
Authorized Officer

Lorne, B

Telephone No. +31 70 340-1002



**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**



**Box No. I Basis of the opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material:-  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing:  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/GB2005/000360

---

**Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

---

**1. Statement**

Novelty (N)	Yes: Claims	1-50
	No: Claims	
Inventive step (IS)	Yes: Claims	1-50
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-50
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

1. Reference is made to the following document:

D1: ELLINGSRUD S ET AL: "Remote sensing of hydrocarbon layers by seabed logging (SBL): Results from a cruise offshore Angola" LEADING EDGE; LEADING EDGE (TULSA, OK) OCTOBER 2002, vol. 21, no. 10, October 2002 (2002-10), pages 972-982, XP002328147

2. The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses a method of analysing results from an electromagnetic survey of an area that is thought or known to contain a subterranean resistive or conductive body comprising the following step :

-providing electric field data and magnetic field data obtained by at least one receiver from at least one horizontal electric dipole (HED) transmitter.

The subject-matter of claim 1 differs from this known document in that a vertical gradient in the electrical field data is determined and in that the vertical gradient in the electrical field data is combined with the magnetic field data to generate combined response data.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

3. The problem to be solved by the present invention may be regarded as a desire to conduct an electromagnetic survey in shallow waters with simple tow patterns.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

The electromagnetic (EM) signals comprise transverse electric (TE) and transverse magnetic (TM) mode components. In shallow water surveys, the airwave component, principally due to the TE mode components, tends to dominate the EM fields induced by the horizontal electric dipole transmitter (HED) at the receiver, especially at long transmitter-receiver horizontal separations. This airwave component contains little

information about subterranean resistivity. Accordingly, if the airwave contributes a significant component to the EM fields induced by the HED transmitter at the receiver, the sensitivity of the technique to subterranean resistivity structures is greatly reduced. Combining the vertical gradient in the electric field data and the magnetic field data allows one to significantly reduce the TE mode component and therefore to detect hydrocarbon reservoirs in shallow water. Furthermore, since there is no mixing between the TE and TM modes in the combined response data, data from all possible transmitter and receiver orientations may be used.

None of the documents cited in the search report disclose or suggest combining the vertical gradient in the electric field data and the magnetic field data to suppress the airwave component.

4. Independent method claims 30 and 37 are alternative solutions in combining the vertical gradient in the electric field data with the magnetic field data to attenuate the airwave component, Therefore they are new and involves an inventive step (Article 33(2)(3) PCT).

For the same reasons the corresponding computer programs, apparatus, EM receiver and EM source for use claims 28,29,35,46,50 for performing methods of claims 1,30,37 are new and involves an inventive step (Article 33(2)(3) PCT).